22. On a Mammalian Mandible (*Cimolestes cutleri*) from an Upper Cretaceous Formation in Alberta, Canada. By Arthur Smith Woodward, LL.D., F.R.S., V.P.Z.S.

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Small mammals with a dentition closely similar to that of the existing opossums have long been known by fragments from the Upper Cretaceous freshwater deposits of North America. Complete jaws, however, are still needed to correlate the isolated teeth which form the majority of the fossils hitherto discovered. An imperfect right mandibular ramus lately obtained for the British Museum by Mr. William E. Cutler is thus of special interest; and its value is increased by the fact that it was discovered in Alberta, Canada, in a somewhat older deposit than the Laramie Formation of Wyoming, U.S.A., in which the previous specimens were found.

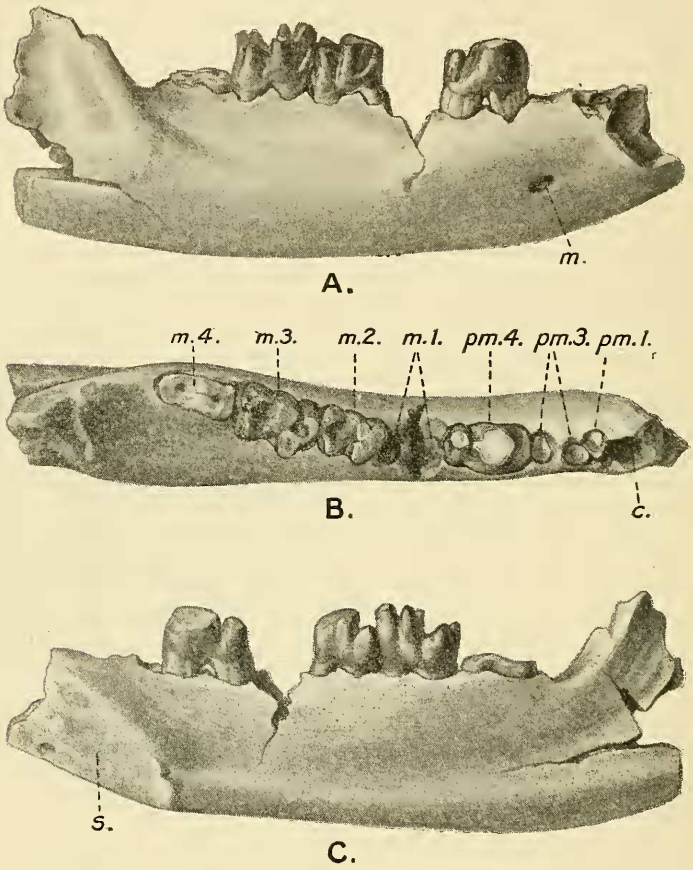
The new mandibular ramus lacks most of the hinder ascending portion and the extremity of the mandibular symphysis, but is otherwise well preserved, with two of the molars, one premolar, the broken roots of the other molars and premolars, and the socket for the large canine tooth. It is shown of twice the natural size, from the outer, upper, and inner aspects in the accompanying text-figure (p. 526). The mandibular symphysis is much elongated, the facette (*s.*) extending as far backwards as the anterior root of the fourth premolar. The large mental foramen (*m.*) on the outer face of the ramus is also situated beneath and just in front of the anterior root of the same premolar.

The four molars and three premolars behind the canine are arranged in close series, and the teeth preserved are considerably worn, showing that the jaw belongs to a fully adult individual. The smooth enamelled crown of these teeth slightly overhangs the root, but there is no cingulum on the outer or inner face. A cingulum is only observable on the anterior and posterior faces of the two molars, where it slopes downwards and outwards. The fourth molar (*m.* 4), which must have been at least as large as the

* [The complete account of the new species described in this communication appears here, but since the name and a preliminary diagnosis were published in the 'Abstract,' No. 158, 1916, the species is distinguished by the name being underlined.—Editor.]

third, is represented only by its double-rooted base. The third and second molars closely resemble those of the opossums, each consisting of a much-raised tricuspid anterior portion (trigonid)

Text-figure 1.



Cimolestes cutleri; imperfect right mandibular ramus, outer (A), upper (B), and inner (C) aspects, twice nat. size.—Upper Cretaceous (Belly River Series): Sand Creek, Red Deer River, Alberta, Canada.

m., mental foramen; *s.*, symphysial facette; *m.* 1–4, molars; *pm.* 1, 3, 4, premolars; *c.*, socket for canine.

with a less raised but extended posterior heel (talonid). The third molar (*m.* 3) is implanted by two very stout roots, of which the posterior is the larger. The relatively large outer cusp

(protoconid) of its trigonid is much more worn than the two inner cusps, of which the anterior (paraconid) is the larger and well separated from the posterior (metaconid) by a deep cleft. Its posterior heel (talonid) is bordered by a much raised rim, which is sharply separated by a groove from the trigonid, and bears one large outer cusp (hypoconid), a smaller inner cusp (entoconid), and a still smaller posterior cusp (hypoconulid), all considerably worn. In the second molar (*m.* 2) the three cusps of the trigonid are about equally worn, and the raised rim of the talonid closely resembles that of the third molar already described, but appears to be more worn. The first molar, represented only by fragments of the roots, is comparatively small. The fourth premolar (*pm.* 4) is very large and inserted by two divergent roots, of which the posterior is the stouter, and both are marked by slight vertical flutings. Its crown consists of a tumid antero-posteriorly elongated cone, with a small, well separated pillar-like cusp behind. The apices of the cone and cusp are truncated by wear, and the large worn surface of the crown is extended by a second small surface of wear antero-internally. The enamel of its outer face exhibits faint traces of vertical wrinkling. The small third premolar is represented only by its two roots (*pm.* 3), and the diminutive foremost premolar, generally regarded in opossums as the first of the normal series, is shown by its simple root (*pm.* 1) to have been displaced inwards. The socket for the procumbent canine (*c.*) is relatively large; and the shape of the broken end of the symphysis suggests that the incisors were very small.

The following are some of the principal measurements, in millimetres:—

Total length of dental series behind canine		...	30
M. 4, maximum length (about)		.....	6
M. 3,	,, length	.....	5·5
	,, breadth	.....	3·5
M. 2,	,, length	.....	4·5
	,, breadth	.....	3·5
M. 1,	,, length (about)	.....	4
Pm. 4,	,, length	.....	5·5
	,, breadth	.....	3·5
Pm. 3,	,, length (about)	.....	4·5

The dentition thus described is closely similar to that of the existing *Didelphys*, but differs in the shape of the large hinder premolar, and doubtless represents a distinct genus. Molar teeth of the same pattern from the Cretaceous Laramie Formation of Wyoming, U.S.A., were named *Cimolestes* by Marsh*, who assigned them to an imperfect jaw in which the sockets indicated

* O. C. Marsh, "Discovery of Cretaceous Mammalia," Amer. Journ. Sci. [3] vol. xxxviii. (1889) p. 89.

a close series of seven teeth behind the canine without any diastema *. The new specimen may therefore be provisionally referred to *Cimolestes*, and as it differs from the type-species (*C. incisus*) by its larger size, and both from this and a second Laramie form (*C. curtus*) by the relatively less elevation of the trigon in the molars, it doubtless represents a new species, which may be appropriately named *C. cutleri* after its discoverer [Abstract P. Z. S. 1916, p. 30 (May 30)]. The large fourth premolar, if it had been found separately, would have been described as *Stagodon* in the nomenclature of Marsh; but it seems to have characterised more than one genus of Cretaceous Marsupials †.

* O. C. Marsh, "Discovery of Cretaceous Mammalia.—Part III.," *loc. cit.* vol. xliii. (1892) p. 258, pl. ix. figs. 5, 6.

† Compare *Thlæodon padanicus*, E. D. Cope, Amer. Naturalist, vol. xxvi. (1892) pp. 758–762, pl. xxii.